MACTEC

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January 15, 2002

Joseph Gowers, Project Manager
U.S. Environmental Protection Agency
Emergency and Remedial Response Division
290 Broadway, 19th Floor
New York, NY 10007-1866

Via Federal Express

Subject: **Work Plan for Supplemental Ground -Water Investigation**
Swope Oil and Chemical Company Site, Pennsauken, New Jersey
MACTEC Project No. 22000-0-0028-100

Dear Mr. Gowers:

On behalf of the Swope Site Cleanup Committee, and as requested in the US Environmental Protection Agency's (USEPA) letter dated December 20, 2003, provided below is a work plan for a supplemental ground-water investigation at the Swope Oil and Chemical Company site (Swope site). The work plan provided below presents a brief description of the well installation and ground-water sampling procedures that will be followed during the supplemental ground-water investigation. As recommended by the USEPA in their December 20th letter, the detailed procedures are not included in this plan but rather are referenced in previously approved site-specific plans (i.e. Operations Plan, Quality Assurance Project Plan and Health and Safety Plan). Please note that as a separate submittal, MACTEC will prepare a brief response letter on behalf of the Swope Cleanup Committee (Committee) addressing the USEPA's comments in the December 20th letter concerning the March 2002 Annual Ground-Water Monitoring Report.

Provided below is a summary of the well installation and ground-water sampling procedures that will be used as a part of this supplemental ground-water investigation.

MONITORING WELL INSTALLATION

The USEPA recommended the installation of two additional shallow aquifer ground-water monitoring wells at the Swope site to further assess ground-water conditions. The two new monitoring wells (MW-9S and MW-10S) will be installed at adjacent off-site locations. Well MW-9S will be located on the western adjacent property owned by the Merchantville Pennsauken Water Company (MPWC) and will be approximately 100 feet north of the Merchantville Pennsauken Water Company (MPWC) National Highway Well No. 1. Well MW-10S will be installed at a location on the southeastern adjacent property owned by Pepsi Cola, Inc. and downgradient of Swope site wells GM-3RS and MW-4. Locations of the proposed wells (GM-9S and GM-10S) are shown on Figure 1.

Consistent with the drilling methodology used during the Supplemental Remedial Investigation, the two new wells will be installed using the hollow stem auger (HSA) drilling method. The borehole for each well will be drilled to a depth of approximately 130 feet below ground surface (bgs), which is the approximate depth of the existing shallow monitoring wells at the Swope site. Split spoon samples will be collected at 10-foot intervals for lithologic characterization purposes. Drill cuttings generated during

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the well installation activities will be transported to the Swope site and spread out on site, consistent with procedures used during the installation of the soil vapor extraction wells. After the borehole is completed to the desired depth, down-hole geophysical logging will be performed using a natural gamma log to assist with the identification of clay layers and placement of the well screen. Natural gamma logs were run in the boreholes of the existing monitoring wells and were useful for stratigraphic correlation of sand and clay units at the Swope site. No soil samples for laboratory analysis will be collected during this investigation. The detailed drilling and soil sampling procedures, including quality assurance protocols are provided in the USEPA-approved Operations Plan for the Supplemental Remedial Investigation/Feasibility Study for the Swope site (Geraghty & Miller, 1987).

After the borehole is logged using the geophysical equipment, a 4-inch diameter well will be constructed in the borehole. The wells will be constructed using 4-inch diameter poly-vinyl chloride (PVC) casing and screen rather than stainless steel casing and screen used during the supplemental RI. As we previously discussed, the use of PVC casing and screen material for the new monitoring wells is appropriate given the relatively low levels of volatile organic compounds reported in ground water at and in the vicinity of the Swope site. It is anticipated that the screened interval for each well will be set at about 110 to 130 feet bgs; however the precise depth of the screen will be selected based on the results of the natural gamma log and review of geologic logs. The details of the well installation procedures including installation of the bentonite seal and cement/bentonite grout are provided in the Operations Plan (Geraghty & Miller, 1987).

Upon completion of well construction, the two new wells will be developed using a submersible pump. Water generated during well development activities will be passed through a granulated activated carbon (GAC) unit and transported to an on-site holding tank at the Swope site. A sample of the development water will be collected for laboratory analysis. Upon receipt of analytical results, the water will be either discharged to on-site ground surface at the Swope site, pending USEPA approval, or properly disposed of at an approved off-site facility. In addition, the location and elevation of the measuring points of the two wells will be surveyed by a New Jersey-licensed surveyor so that water-level elevations can be obtained. The elevations of the wells will be surveyed relative to mean sea level, consistent with the datum of the existing monitoring well network.

After well construction and well development activities are completed, the newly installed wells will be equipped with a dedicated pump. The dedicated pump assemblies will consist of a submersible stainless steel Grundfos Redi-Flo II pump, Teflon-lined polyethylene tubing, and Teflon-coated stainless steel pump-hanging cable. Prior to installation in the wells, the pumps and associated dedicated equipment will be decontaminated per USEPA guidance procedures.

GROUND-WATER MONITORING PROGRAM

Approximately two to three weeks after wells MW-9S and MW-10S are installed, ground-water samples will be collected from these two new wells only, and analyzed for the target compound list (TCL) volatile organic compounds (VOCs) using USEPA-Method CLP OLM03.2 and selected field parameters. Field parameters include dissolved oxygen (DO), oxidation-reduction potential (ORP), pH, temperature, and specific conductance.

Approximately one month after the laboratory results of the samples collected from Wells MW-9S and MW-10S are received, a full round of ground-water samples will be collected from the shallow and deep monitoring wells, including MPWC Well No. 1 and the Pennsauken Landfill well MW-7 and analyzed

for VOCs and the field parameters. In addition, to assess on-going natural biodegradation processes, selected biogeochemical parameters will be analyzed as follows:

- Classic Chemistry (STL Laboratories) - biological oxygen demand (BOD), chloride, nitrate, nitrite, total Kjeldahl nitrogen (TKN), dissolved organic carbon (DOC), total organic carbon (TOC), and sulfate;
- Sulfide and ferrous iron in the field utilizing HACH™ colorimeter test kits
- Light hydrocarbons (Vaportech) - Ethene and ethane; and,
- Permanent gases (Vaportech) - carbon dioxide, oxygen, nitrogen, and methane.

A list of the planned monitoring well network for the Swope site is provided in Table 1.

Sample Collection Frequency

Samples will be collected on an annual basis for VOC and field parameter analyses, including the biogeochemical analyses.

Sampling Procedures

Ground-water samples will be collected using low-flow sampling procedures in accordance with USEPA Region II Final Ground-Water Sampling Standard Operating Procedures (SOP) (USEPA 1998a), and in general conformance with the Ground-water Sampling Plan provided in the Final Operation and Maintenance Plan for the Swope Site (Geraghty & Miller, 1996). The USEPA approved the use of the low-flow ground-water sampling technique for the Swope site in February 1999 (USEPA, 1999). These procedures were followed during the recently completed five-year ground-water monitoring program. A brief summary of the sample collection procedures is provided below.

Water Levels

Water levels will be measured in all the wells except the municipal well (MPWC-1) prior to each ground-water monitoring event to calculate the water-level elevation relative to mean sea level. These data will be used to prepare the ground-water flow maps for the shallow and deep aquifers.

Well Evacuation

Water will be pumped from the well at a flow rate of about 200 milliliters per minute (ml/min) to 500 ml/min; the flow rate will be monitored using a graduated beaker and watch. The pump tubing will be connected at the surface to an inline flow-through cell for measuring the following field parameters: pH, temperature, specific conductance, oxidation-reduction potential (ORP), dissolved oxygen, and turbidity. During purging, the depth to water and field parameters will be measured at five-minute intervals and recorded on ground-water sampling logs. Each well will be considered stabilized and ready to sample when field parameter values recorded over three consecutive readings are within the following ranges: pH (+/-0.1 unit), specific conductance (+/-3%), ORP potential (+/-10 millivolts [mV]), dissolved oxygen (10%), and turbidity (10%).

Water purged from the wells (except MPWC-1) will be passed through a GAC and stored on-site in a polyethylene tank pending USEPA approval to pass the water through a green sand filter and then discharge it to the ground surface on-site.

Except for the municipal well, ground-water samples will be collected directly from the dedicated pump assemblies by lowering the pumping rate to a rate of between 100 ml/min to 250 ml/min, and directing water from the pump tubing directly into pre-labeled bottles prepared by the laboratory. Well MPWC-1 will be sampled directly from a sample port at the wellhead. Sample bottles will be packed on ice in a cooler with a chain-of-custody form and shipped via courier on a daily basis to Severn Trent Laboratories (STL) for analysis.

QA/QC Samples

Quality assurance/quality control (QA/QC) samples will be analyzed for target compound list (TCL) VOCs by USEPA Method CLP OLM03.2 and select MNA parameters. One replicate sample and one matrix spike/matrix spike duplicate (MS/MSD) sample will be collected and submitted to the laboratory for analysis during each sampling event, and a trip blank for TCL VOCs analysis only will be submitted daily to the laboratory.

REPORTING

An annual ground-water monitoring report will be prepared summarizing each monitoring event. The report will include the following: tabulated validated data; evaluation of the data; and ground-water contour maps for the shallow and deep aquifers. The first annual report will include a summary of the well installation activities.

If you have any questions or need additional information, please do not hesitate to call Douglas Newton at (609) 936-0700.

Sincerely,

MACTEC Engineering and Consulting of Georgia, Inc.

Scott Horsnall
Project Geologist

Douglas J Newton, CPG
Principal Geologist

Attachment – Figure 1

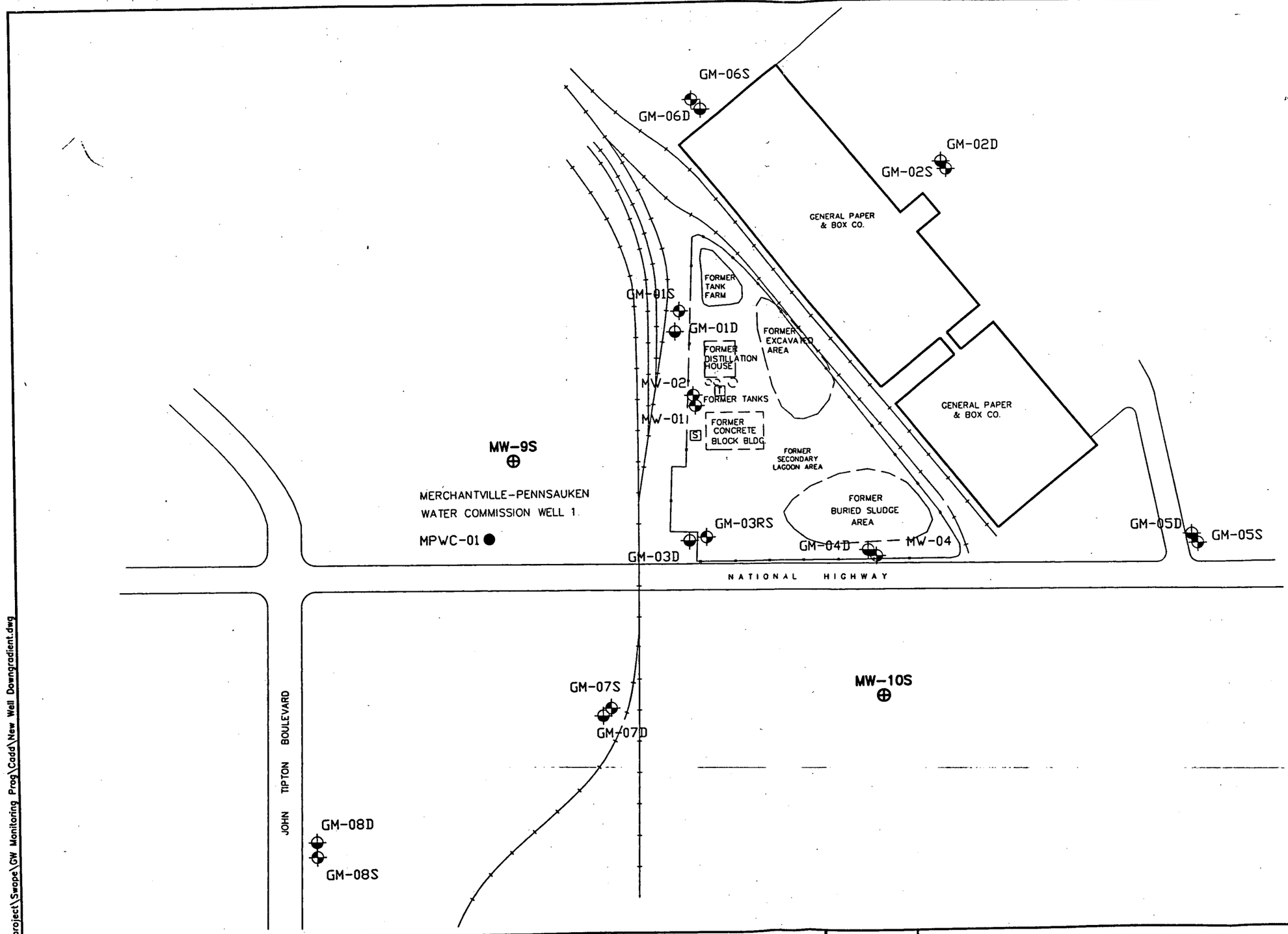
Cc: John M. Ix, Esquire – Dechert (one copy)
John Vidumsky – Dupont (one copy)
John Rhodes – Rhodes Engineering (one copy)
Jim DeNoble – NJDEP (one copy)

Table 1. Summary of Monitoring Well Network – Swope Oil and Chemical Company Site, Pennsauken, New Jersey.

Shallow - upgradient	Shallow - downgradient
GM-2S	GM-1S
GM-6S	GM-3RS
MW-7 (Pennsauken Landfill)	MW-1
	MW-2
	MW-4
	GM-5S* (side gradient)
	GM-7S
	GM-8S
	MW-9S (Proposed)
	MW-10S (Proposed)

Deep - upgradient	Deep - downgradient
GM-2D	GM-1D
GM-6D	GM-3D
	GM-4D
	GM-5D* (side gradient)
	GM-7D
	GM-8D
	MPWC-1

*Formerly upgradient, currently side gradient.



KEY

- GM-07S — LOCATION AND DESIGNATION OF MONITORING WELL SCREENED IN THE SHALLOW AQUIFER
- GM-07D — LOCATION AND DESIGNATION OF MONITORING WELL SCREENED IN THE DEEP AQUIFER
- ● PRODUCTION WELL SCREENED IN THE DEEP AQUIFER
- [T] APPROXIMATE LOCATION OF FORMER UNDERGROUND STORAGE TANK
- [S] APPROXIMATE LOCATION OF FORMER SEPTIC TANK
- ⊕ PROPOSED SHALLOW AQUIFER MONITORING WELL

SCALE: 0 — 275 FT

SWOPE OIL & CHEMICAL COMPANY
PENNSAUKEN, NEW JERSEY

PREPARED BY: SH	1/16/03
DRAWN BY: MCW	1/16/03
CHECKED BY: DJH	
DATE:	1/16/03

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LOCATION OF THE PROPOSED SHALLOW AQUIFER WELLS AT THE SWOPE OIL AND CHEMICAL COMPANY SITE, PENNSAUKEN, NEW JERSEY

PROJECT NO. 22000-0-0028 FIGURE

File: P:\From LAW\Aproject\Swope\GW Monitoring Prog\Cadd\New Well Downgradient.dwg